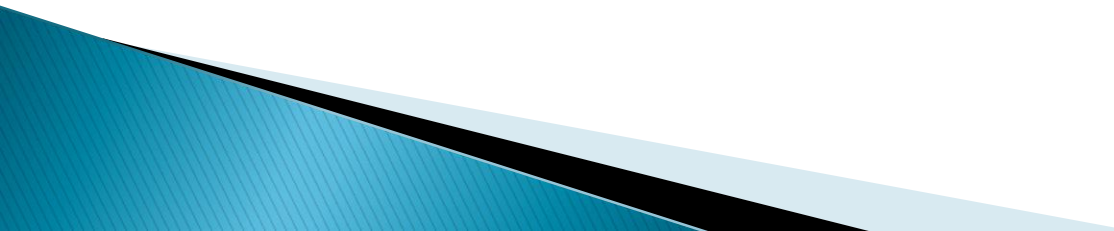


**DSD**

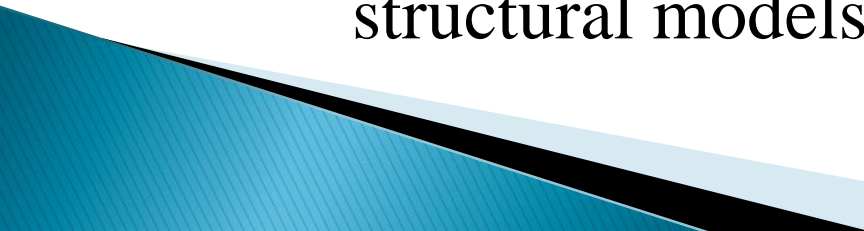
**Digital System Design**



# Reference books

- ▶ “A VHDL Primer” by J.Bhasker
  - ▶ “Digital System Design using VHDL” by Charles H. Roth
  - ▶ “Digital System Design” by Neelu chaudhary or Yogesh Mishra
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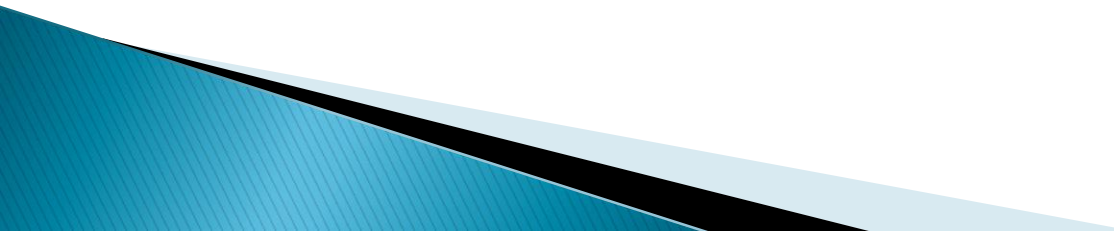
# Section-A

- Introduction to Computer-aided design tools for digital systems.
  - Hardware description languages
  - Introduction to VHDL data objects, classes and data types, Operators, Overloading, logical operators.
  - Types of delays
  - Entity and Architecture declaration.
  - Introduction to behavioral dataflow and structural models.
- 

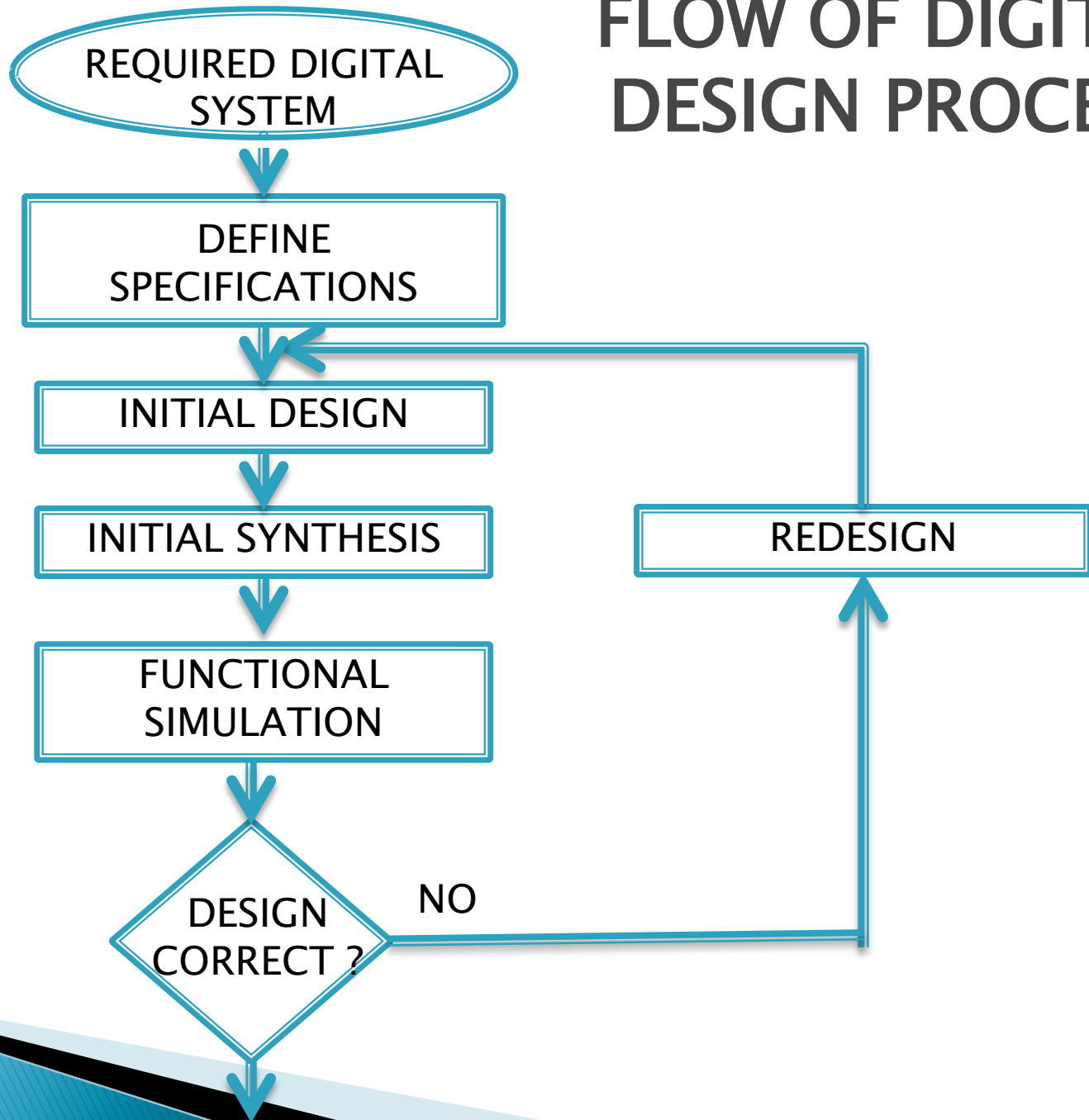
# Introduction to Computer-aided design tools for digital systems

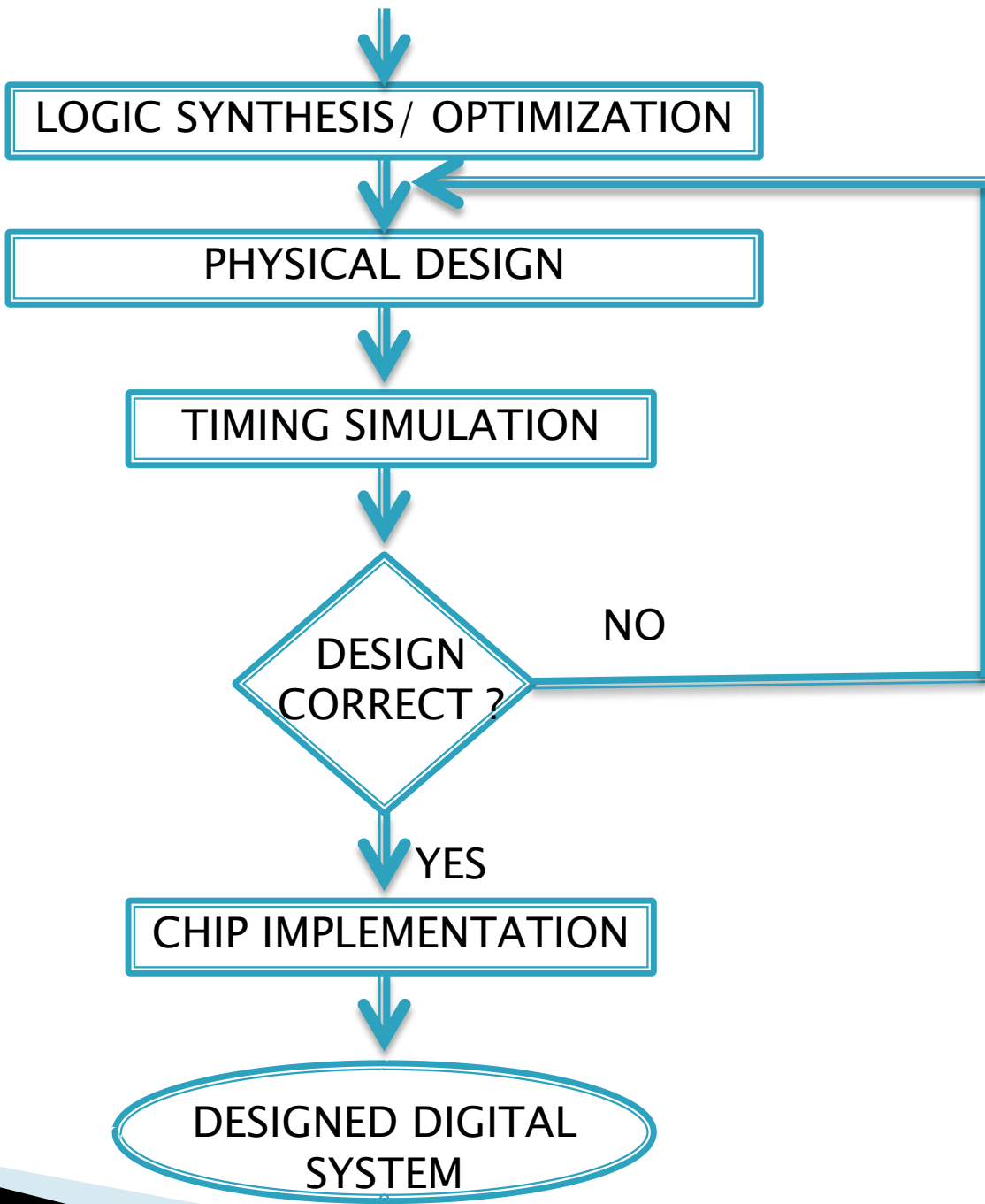
- ▶ The design methods which make the use of computer are known as Computer Aided Design methods.
- ▶ CAD tools refer to software tools that aid the development of circuits, systems and other things.
- ▶ Different CAD Tools for digital systems are:
  - Schematic entry tools
  - HDLS
  - HDL compilers, simulators and synthesis tools
  - Simulators
  - Test benches
  - Timing Analyzers and verifiers.

# Applications of CAD Tools:

- ▶ For design and simulation of capacitive micro-accelerometer.
  - ▶ In micro and macro systems
  - ▶ In typical filter design cycle
  - ▶ Designing of MEMS Devices
- 

# FLOW OF DIGITAL DESIGN PROCESS





# VHDL

VH S I C → Very High Speed Integrated Circuit

Hardware

Description

Language

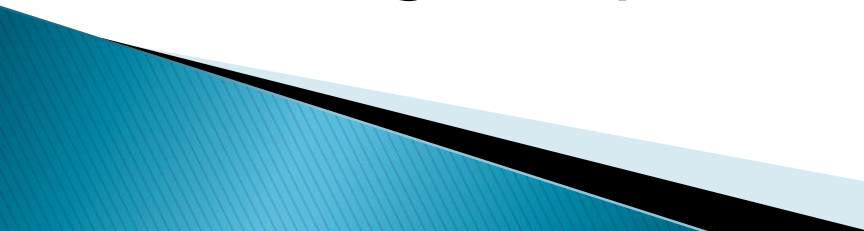
- It is a language used to describe digital circuits.
- It is similar to computer programming except HDL is used to describe hardware rather than a program to be executed.



# VHDL

- It is a hardware description language that can be used to model a digital system.
- The VHDL language can be regarded as an integration of the following languages:  
sequential language +  
concurrent language +  
net-list language +  
Timing specifications +  
waveform generation language => VHDL

# VHDL's History

- ▶ In 1981: Department of Defense of USA was involved with various vendors to purchase VHSIC chips and all those vendors were using different HDL to describe their product.
  - ▶ Due to this DoD was facing problem of testing and verification. At that time the need of a standard HDL which is capable of design, documentation and verification of digital system was generated.
- 

# VHDL's History (cont.)

- ▶ In 1983: DoD gave contract to IBM, Texas Instruments and Intermetrics to develop a language which can describe a hardware.
- ▶ In 1985: Version 7.2 VHDL was developed and released for public . In 1986, to standardize the language it had been handed over to IEEE
- ▶ In 1987: Standard Version of VHDL “ IEEE Std 1076–1987” was launched for industrial use.
- ▶ In 1993: language was upgraded with new features and upgraded version “ IEEE Std 1076–1993” was launched.